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ORIGINAL ARTICLES.

I.—EMINENT LIVING GEOLOGISTS.

AUBREY STRAHAN, M.A., Sc.D. (Camb.), F.R.S., Hon. LL.D. Toronto, V.P.G.S.; Director of the Museum of Practical Geology and Geological Survey of Great Britain.

(WITH A PORTRAIT, PLATE VII.)

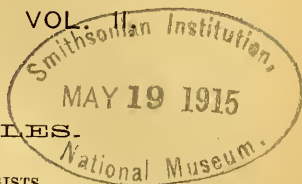
THE records of the Geological Survey of Great Britain date back nearly as far as the first public recognition of geology as a science in this country.

Topographical map-making by the Ordnance Survey commenced in 1784, but it was not until about 1830, when the Director of Ordnance happened to see the excellent maps of the mining districts of Cornwall, the unaided work of De la Beche, that he wisely determined that the mineral delineation should be carried out upon the Ordnance Maps, a task which he induced De la Beche to undertake. Thus initiated, under the support of Major-General T. F. Colby, the Director of Ordnance, the Geological Survey commenced its career in Devon and Cornwall long before it had a local habitation and hardly a name. But through the influence of Government in 1837, Sir Henry De la Beche obtained a house in Craig's Court, Charing Cross, which became "The Museum of Economic Geology", and "The Mining Record Office" later on.

With but few assistants (until 1840) De la Beche traversed many thousand miles, hammer in hand, producing maps which have been the admiration of all who have had occasion to consult them, and thus laid the foundation of the Geological Survey of the United Kingdom and of the Museum of Practical Geology, which was opened in Jermyn Street by the Prince Consort in 1851. Although now shorn of its School of Mines and of its Irish Branch, this building is still the Museum of Practical Geology and the headquarters of the Geological Survey of Great Britain.

For nearly a century (1830–1915), from the date of its genesis under Sir Henry De la Beche, the Geological Survey has enjoyed the unrivalled advantage of a succession of distinguished scientific Directors, all of whom were experienced practical geologists, who had made their mark in the field as well as in the laboratory before reaching the chieftainship of the Royal hammerers.

Sir Henry De la Beche, the founder of the Survey, who passed away in 1855, was followed by Sir Roderick I. Murchison, whose name was already widely known, having been elected twice as



President of the Geological Society, and who left his mark as the author of *The Silurian System* and *The Geology of Russia*. Upon his decease in 1871, the office was filled by Sir Andrew Ramsay, who had been a member of the Survey since 1841, and local Director since 1845, his associates having been Sir Henry James, Dr. Oldham, Professor Jukes, Edward Forbes, A. R. C. Selwyn, Sir William Logan, John Phillips, and other famous geologists. Although only ten years Director-General he had been on the staff for forty years. On his retirement in 1881 at the age of 67, a third eminent Scottish geologist, Sir Archibald Geikie, became Director-General. He had already served on the Scottish Survey for twenty-six years, and at the time of his retirement in 1901 had completed forty-six years of service.

In the appointment of his successor consideration was paid to the special importance of the work of the modern science of petrography in the Geological Survey. For his eminent qualifications in this subject Dr. J. J. Harris Teall had been invited to join the Survey in 1888, and was selected as Director in 1901. Dr. Teall retired on the completion of his 65th birthday on January 5, 1914. (See *GEOL. MAG.*, 1909, pp. 1-8.)

Dr. Aubrey Strahan, the subject of this memoir, and the sixth Director since the establishment of the Geological Survey, has already attained a long and distinguished period of service and added largely to its Records, especially in the investigation of the British Coal-measures and the making of those splendid maps embodying the results of many years of careful and detailed field-work.

Born in London on April 20, 1852, Aubrey Strahan is the fifth son of William Strahan and Anne Dorothea Strahan (only child of Sir George Fisher). He spent his boyhood at Sidmouth, and received his early education at the Rev. W. T. Browning's school at Thorpe Mandeville, Northamptonshire. At 13 he was sent to Eton until 1870. During his school-days at Eton the Chemical Laboratory was built, and a prize for Chemistry (probably the first prize ever given at Eton for any branch of Natural Science) was won by him. A. Strahan proceeded to St. John's College, Cambridge, in 1870 (where his father had also studied). His interest in geology had been stimulated by the Rev. Osmond Fisher (his mother's first cousin), and his first course of the science was in Professor Bonney's lecture-room, where so many geologists received their early training.

A. Strahan graduated in 1875, and on May 12 of that year was appointed to the Geological Survey under Professor Sir Andrew Ramsay. He commenced his field-work in South Lancashire, and proceeded thence into Cheshire. After completing the surveying of the country around Chester he was engaged upon the Lower Carboniferous rocks of Flintshire with their metalliferous veins, the Silurian rocks of the Clwydian range, and the Trias of the Vale of Clwyd, a deep faulted trough of which the structure was then unknown.

In 1883, Strahan was transferred to Lincolnshire to assist in completing the last of the *Old Series* of 1 inch maps. In the two following years he was sent to the neighbourhood of Kendal and Sedbergh, and in 1886 revised the mapping of the Coal-measures, the

Cambrian and pre-Cambrian rocks, near Nuneaton, in order to make the corrections on the map rendered necessary by the discoveries then recently made by Professor Lapworth. Later on in the same year the mines of a part of Derbyshire were examined for the second edition of the Survey memoir on North Derbyshire.

In the latter part of 1886 Mr. Strahan commenced the 6 inch survey of the southern part of the Isle of Wight, and in 1887 he continued the work into the Isle of Purbeck. In 1891, it having been represented in the House of Commons by Sir Hussey Vivian (afterwards Lord Swansea) that the geological maps of the South Wales Coal-field were obsolete, the re-survey of that important area was commenced by Strahan and carried on continuously to its completion, save for two brief interruptions, one to the Isle of Man in 1892 and the other in the Cumberland Coal-field in 1894.

In 1886 Aubrey Strahan married Fanny Evelyn Margaret, daughter of the late Edward H. Roscoe.

In addition to his important work in the field as a Geological Surveyor, Dr. Strahan has contributed upwards of thirty-five memoirs to the publications of the Geological Survey between 1881 and 1915 (the titles of which appear at the end of this notice); but his scientific activities extended far beyond his official duties. For instance, he wrote an appendix to Major Conyngham's *Pendulum Observations in India*, and published numerous papers in the *Quarterly Journal of the Geological Society*, including two Presidential Addresses (1913-14). Since 1881 he has written many papers for the *GEOLOGICAL MAGAZINE* (see list). In 1905 he prepared an important Report on the Coal-fields of Lancashire, Cheshire, and North Wales for the Royal Commission on Coal Supplies.

In 1913 Dr. Strahan was present at the International Congress at Toronto, and contributed the British Section to the Canadian volumes on the 'World's Coal Resources', published last year. As will be seen by the titles of his papers, his contributions to geological science were many and varied, but those which relate to the coal formations of Great Britain have a special importance in connexion with the unexplored areas which lie outside the known fields and await to be exploited in the future.

In 1875 he was elected a Fellow of the Geological Society, and has for many years served upon the Council. He filled the office of Treasurer (1909-12) and of President (1912-14). He was elected to the Royal Society in 1903 and has been on its Council (1909-10).

As a Fellow of the Royal Geographical Society, he was not only on the Council but acted as Chairman of the Research Department. He is an Honorary Member of the Chester Society of Natural Science and of the North of England Institute of Engineers. He accompanied the Total Eclipse Expedition to Vadso in 1896, and visited a section in the glacial deposits of Palæozoic age, also the raised beaches on the Varanger Fiord, and described them both at the Geological Society on his return. He served as President of Section C of the British Association at Cambridge in 1904, and in 1909 attended the meeting at Winnipeg, taking the opportunity to visit Vancouver. In 1910 he attended the International Geological

Congress in Stockholm and took part in an expedition to Spitzbergen. Three years later he attended the same Congress at Toronto as delegate from the British Government and as representative of the Geological Society and the Geological Survey. He was elected a Vice-President of the Congress, and received the honorary degree of LL.D. at the University of Toronto. On this occasion he took part in an excursion through New Brunswick and Nova Scotia. Dr. Strahan was made a member of the Royal Commission on Coal Supply in 1903 and furnished the Report on the Lancashire and Cheshire coal areas and on the concealed coal-fields of England and Wales (apart from the Midlands). In the same year he made a report to the Royal Commission on Arsenical Poisoning.

Out of the long list of famous British geologists who, by their labours in the past century, have so largely contributed to the building up of our science, a great part of them will also be found to have had a share in the making of the Geological Survey of this country. The present Director, Dr. Aubrey Strahan, must feel much gratification that in this task he also has contributed no mean share, both in the completion of its cartography and its numerous published memoirs, whilst as our leading authority on the great and important subject of the economics of our coal-fields he has made for himself a special name. He has carefully carried on his geological studies both at home and abroad, and possesses the experience won by long service and extended observation. But for the present sad war, which has disarranged all our peaceful enterprises, much attention would have been given at the present time by the Government to the anxious 'question of the hour', the extent and duration of our coal-supply.

We may sincerely congratulate the staff of the Geological Survey that in their present Director they have a man who has achieved his position by long years of earnest labour, and who is thoroughly conversant with their work and in sympathy with themselves.

LIST OF GEOLOGICAL SURVEY MEMOIRS AND PUBLICATIONS
BY DR. AUBREY STRAHAN, M.A., F.R.S.

- 1881. Geology of Chester.
Geology of Prescott: by E. Hull; third edition, with additions by A. Strahan.
- 1885. Geology of Rhyl, Abergele, and Colwyn.
- 1887. Geology of North Derbyshire: by A. H. Green and others; second edition by A. H. Green and A. Strahan.
- 1888. Geology of Kendal, Sedbergh, Bowness, and Tebay: by W. T. Aveline and T. McK. Hughes; second edition, revised and enlarged, by A. Strahan.
Geology of the Country around Lincoln: edited and in part written by A. Strahan.
- 1889. Geology of the Isle of Wight: by H. W. Bristow; second edition, revised and enlarged, by C. Reid and A. Strahan.
- 1890. Geology of Flint, Mold, and Ruthin.
Geology of the Country around Ingleborough: edited and in part written by A. Strahan.
- 1891. Geology of Mallerstang: edited and in part written by A. Strahan.
- 1898. Geology of the Isle of Purbeck and Weymouth.
Supplement to the Memoirs on the Geology of Flint, Mold, and Ruthin.

- 1899. The Country around Newport.
- 1900. The Country around Abergavenny : with W. Gibson.
- 1901. The Country around Cardiff : with T. C. Cantrill.
- 1903. The Country around Pontypridd and Maestêg : with R. H. Tiddeman and W. Gibson.
- 1904. The Country around Merthyr Tydfil : with W. Gibson and T. C. Cantrill.
The Country around Bridgend : with T. C. Cantrill.
- 1906. Guide to the Model of the Isle of Purbeck.
- 1907. The Country around Swansea.
The Geology of West Gower.
The Country around Ammanford : with T. C. Cantrill, E. E. L. Dixon, and H. H. Thomas.
- 1908. The Coals of South Wales : with W. Pollard.
- 1909. The Country around Newport, second edition.
The Country around Carmarthen, with T. C. Cantrill, E. E. L. Dixon, and H. H. Thomas.
- 1910. Guide to the Model of Ingleborough.
- 1911. On a Deep Channel of Drift at Saham Toney ; Summary of Progress for 1910.
- 1912. The Country around Cardiff : with T. C. Cantrill ; second edition.
On a Boring for Coal at Ebbsfleet ; Summary of Progress for 1911.
- 1913. On a Boring at Batsford ; *ibid*.
- 1914. Notes on Sources of Temporary Water Supply in the South of England and neighbouring parts of the Continent.
On the Country around Haverfordwest : with T. C. Cantrill, E. E. L. Dixon, H. H. Thomas, and O. T. Jones.
- 1915. The Coals of South Wales, second edition : with W. Pollard ; in the press.
On a Boring at Whittlesford ; Summary of Progress for 1914 ; in the press.

LIST OF PUBLISHED PAPERS COMMUNICATED TO SOCIETIES AND JOURNALS
APART FROM THE PUBLICATIONS OF THE GEOLOGICAL SURVEY.

- 1879. "On the Occurrence of Pebbles with Upper Ludlow Fossils in the Lower Carboniferous Conglomerates of North Wales" : *Quart. Journ. Geol. Soc.*, vol. xxxv, p. 269 (with A. O. Walker).
- "On some Glacial Striæ on the Coast of North Wales" : *Proc. Liverpool Geol. Soc.*, vol. iv, p. 44.
- 1881. "On the Lower Keuper Sandstone of Cheshire" : *GEOL. MAG.*, 1881, pp. 396, 574.
- "On the Discovery of Coal-measures under New Red Sandstone and on the so-called Permian Rocks of St. Helens, Lancashire" : *GEOL. MAG.*, 1881, p. 433.
- 1882. "On the Channel Tunnel" : *Nature*, vol. xxv, p. 463.
- 1883. "On the Movements of Air in Fissures and the Barometer" : *Nature*, vol. xxvii, p. 375.
- 1884. "The Denudations of North Wales" : *Proc. Chester Soc. Nat. Science*, pt. iii, p. 38.
- 1885. "The Geology of Cheshire" : *Proc. Inst. Iron and Steel*.
- 1886. "On the Glaciation of South Lancashire, Cheshire, and the Welsh Border" : *Quart. Journ. Geol. Soc.*, vol. xlii, p. 369.
- "Notes on the Relations of the Lincolnshire Carstone" : *ibid.*, vol. xlii, p. 486.
- "On the Rocks surrounding the Warwickshire Coal-field and on the Base of the Coal-measures" : *GEOL. MAG.*, 1886, p. 540.
- 1887. "On Explosive Slickensides" : *GEOL. MAG.*, 1887, p. 400.
- 1891. "On a Phosphatic Chalk with *Belemnitella quadrata* at Taplow" : *Quart. Journ. Geol. Soc.*, vol. xlvii, p. 356.
- 1895. "On Overthrusts of Tertiary Date in Dorset" : *Quart. Journ. Geol. Soc.*, vol. li, p. 549.

1896. "On a Phosphatic Chalk with *Holaster planus* at Lewes": Quart. Journ. Geol. Soc., vol. lii, p. 563.
 "On Submerged Land-surfaces at Barry, Glamorganshire": *ibid.*, vol. lii, p. 474.
1897. "On the Glacial Phenomena of Palæozoic age in the Varanger Fiord": Quart. Journ. Geol. Soc., vol. liii, p. 137.
 "The Raised Beaches and Glacial Deposits of the Varanger Fiord": *ibid.*, p. 147.
1898. "On the Revision of South Wales and Monmouthshire by the Geological Survey": GEOL. MAG., 1898, p. 488.
1899. "On the Age of the Vale of Clwyd": GEOL. MAG., 1899, p. 111.
 "On an Abnormal Section of Chloritic Marl at Mupe Bay, Dorset": *ibid.*, p. 319.
1901. "On the Passage of a Seam of Coal into a Seam of Dolomite": Quart. Journ. Geol. Soc., vol. lvii, p. 297.
 "On the Origin of Coal": GEOL. MAG., 1901, p. 29.
1902. "On the Origin of the River System of South Wales and its connection with that of the Severn and the Thames": *ibid.*, vol. lviii, p. 207.
1904. Presidential Address to Section C of the British Association: Rep. Brit. Assoc. for 1904.
1905. Report on the Coal-fields of Lancashire, Cheshire, and North Wales, and on Concealed and Unproved Coal-fields, for the Royal Commission on Coal Supplies.
1906. "Investigation of Rivers" (with others): Geog. Journ., 1st Rep., 1908; 2nd Rep., 1909; 3rd Rep., 1910; 4th Rep., 1911; Final Report in the press.
1908. Appendix to paper on the Pendulum Observations in India by Major G. P. L. Conyngham: Survey of India, Professional Papers, No. 10.
1910. "Glacial Phenomena of South Wales": Rep. Brit. Assoc. for 1909, p. 475.
 "The Geology of South Wales": Geol. Assoc., Jubilee vol., p. 826.
1913. Presidential Address ["On the Palæozoic Platform"] to the Geological Society of London: Quart. Journ. Geol. Soc., vol. lxix, p. 70.
1914. Presidential Address ["On Problems of Post-Glacial Denudation"] to the Geological Society of London: Quart. Journ. Geol. Soc., vol. lxx, p. 59.
 "The Subdivisions and Correlation of the Pre-Cambrian Rocks of the British Isles": Internat. Geol. Congress, Twelfth Session (1913), Canada, *Compte-rendu* (1914), p. 339.
 "On the Coal Resources of Great Britain": Internat. Geol. Congress, Twelfth Session (1913), Canada; "The Coal Resources of the World," p. 597.

II.—DIFFERENTIAL MOVEMENT IN EAST ANGLIA IN TERTIARY TIMES.

By P. G. H. BOSWELL, B.Sc., D.I.C., F.G.S., Imperial College of Science and Technology, South Kensington.

THE sudden change of strike of the Chalk in South-East Suffolk, exceeded only in abruptness at the western limit of the London Basin, is accompanied by Tertiary phenomena equally interesting, and the occurrence of the Palæozoic platform at a small depth under the Chalk in the deep borings at Culford, Stutton, Harwich, and Weeley is, in this connexion, very significant.

Silurian or older rocks are separated from the Chalk at Culford, Stutton, and Weeley by a small thickness of Gault and Greensand only, while the rock met with in the Harwich boring, below 61 feet of the same beds, is believed by Professor W. W. Watts to have its closest